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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,882	09/19/2003	Darrell Rinerson	UNTYP027	6771

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EXAMINER

ECKERT II, GEORGE C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.

10/665.882

Applicant(s)	
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RINERSON ET AL.

Examiner

George C. Eckert II

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 3/30/05.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment dated March 24, 2005 in which claims 1, 4 and 24 were amended and claims 28-31 added has been entered.

Claim Objections

2. The previous objections to claims 4, 22 (the second 22) and 24 are overcome by applicant's amendment.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. (6,204,139, of record). Liu et al. teach in figure 1 a resistive memory device comprising:

a conductive bottom electrode 10;

a multi-resistive state element 14 arranged on top of and in contact with the bottom electrode 10 such that a bottom interface is created (by means of their proximity), the multi-resistive state element having a substantially crystalline layer that, while substantially maintaining its substantially crystalline structure has a modifiable resistance (the material used by Liu et al. is the perovskite PCMO (col. 3, lines 26-28) which is a crystalline material and changes its resistivity based on application of an electric field or current (col. 3, lines 44-45);

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note also that PCMO is the same material as described by applicant for use in the instant invention, spec. para. 0047; finally, note that Liu et al. teach that too high an electric field or current will destroy the crystal or microstructure of the perovskite (col. 3, lines 55-57) while the Liu et al. device is operated such that the resistance is changed without destruction of the crystal (col. 3, lines 58-63)); and

a conductive top electrode 15 arranged on top of and in contact with the multi-resistive state element such that a top interface is created (by its proximity);

wherein the resistance of the memory device may be changed by applying a first voltage having a first polarity across the conductive electrodes and reversibly changed by applying a second voltage with a second polarity across the conductive electrodes (col. 4, lines 18-22); and

wherein at least one of the interfaces is subjected to a treatment directed towards changing properties of the at least one interface (col. 5, lines 12-23).

Regarding claims 2-26, these claims are drawn to a method by which the interface treatment is performed. First, because Liu et al. already teach that an interface is created between at least one electrode and the multi-resistive state element (col. 5, lines 20-23), it is immaterial in a product claim such as this how that interface was created since it is the final product that is considered for patentability. Furthermore, Liu et al. do teach several methods by which the interface may be treated when formed. For example, Liu et al. teach in column 4, lines 55-59 that the device is formed in an oxidizing environment during deposition which reads on the process of claim 5 ("exposure to a gas"). Therefore, the remaining claims are also considered anticipated by Liu et al.

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4. Claims 28-31 are rejected under 35 U.S.C. 102(a) as being anticipated by *Reproducible Electric-Pulse Induced Resistive (EPIR) Switch Effect of Manganite Films for Non-Volatile Memory Applications* to Liu et al. (the article itself is not dated but is here provided with the first page of a presentation of the article Liu et al. made on 11/4/02. The presentation and article may be found at http://klabs.org/richcontent/MemoryContent/nvmt_symp/nvmts_2002/docs/26/26_ignatiev_s.pdf and http://klabs.org/richcontent/MemoryContent/nvmt_symp/nvmts_2002/docs/26/26_ignatiev_p.pdf respectively).

Liu et al. teach a resistive memory device comprising:

a conductive bottom electrode, substantially polycrystalline multi-resistive state element and a top electrode (Liu et al. teach under *PCMO FILM DEPOSITION*, that a layer of PCMO is deposited on a Pt lower electrode and teach under *RESISTANCE SWITCHING PROPERTIES OF PCMO FILMS*, that an Au upper electrode is formed on the PCMO and that the PCMO, which is a perovskite, is polycrystalline);

wherein the resistance of the memory device may be programmed by applying first and second voltages having different polarities (see fig. 3); and

wherein at least one of the interfaces has been subjected to a treatment (see again *PCMO FILM DEPOSITION* where Liu et al. teach that the device is formed in an oxygen ambient which is considered a treatment that changes the device properties).

Response to Arguments

5. Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new grounds of rejection.

Conclusion

6. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


GEORGE ECKERT
PRIMARY EXAMINER